

CONTRACT WITH BREWER **General Ecology - Biology 322**

Instructor: Stephen Brewer, Professor of Biology (lecture and labs)

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Text (recommended): Ecology, M.L. Cain, W.D. Bowman, and S.D. Hacker, Sinauer.

Learning Outcomes: An important goal of this course is to enhance students' existing curiosity about and understanding of the natural world. After completing this course, you should understand and appreciate relationships between various organisms, including humans, and their environment. In addition, this course will provide a basis for objectively evaluating current issues, particularly those related to ecology, evolution, and human impacts on the environment (and vice versa). These outcomes will be achieved by evaluating performance on traditional exams and laboratory exercises and participation in a class debate.

Instructions for students: *All examinations will be based on material covered in lecture, from handouts, and from laboratory material. I will periodically assign reading from the text, but only to provide supportive material for the lecture. You will not be tested on any material from the text that I do not also cover in lecture. For this reason, the text is recommended but not required. Occasionally, material from the laboratory may appear on tests, but I will explicitly state which laboratory material you will need to study. You may be tested on material from handouts, regardless of whether I cover the material in lecture.*

Attendance and Participation: You are expected to attend class every session. The text (though helpful) is not an adequate substitute for the lecture, and I generally will not post lecture material on Blackboard. I will periodically take attendance, which could affect your grade. Also, your performance on the exams will almost certainly suffer if you do not regularly attend class.

Class starts at 10:00 sharp. I give everyone 5 minutes at the beginning of the class to copy the outline for that day's lecture. Lecture begins at 10:05. ***You should be seated and listening at that point, not just entering the classroom or still writing down the outline.***

Labs begin Tuesday and Wednesday January 28 and 29. *Attendance in lab is required, and your TA will take attendance at every laboratory session. It is your responsibility to ensure that the TA knows you attended the lab. Assume your TA will mark you absent if you arrive after he has taken roll. Since most labs will be field trips, PLEASE BE ON TIME TO LAB. No make-up labs will be given.*

Check your University email account or Blackboard every Monday morning for laboratory assignments.

Electronic Device Policy: Your personal electronic devices have no place in the ecology classroom and are very distracting. ***You are not to use cell phones, smartphones, iPods, iPads or similar devices at anytime during class time or lab time. They must be silenced and stowed; no viewing of their screens is allowed.***

Laptop computers can be used for taking notes only (and not for internet searches) and are restricted to the first four rows of the classroom. Failure to observe these rules will negatively affect your participation grade.

Requirements, exams, grades, etc.: The final grade is based on regular exams, a final exam, and a laboratory grade as follows:

Exam 1	25%
Exam 2	25%
Exam 3	25%
Final Exam	25%
Laboratory	25%

 $125\% - 25\% \text{ (for lowest regular exam score)} = 100\%$

Grade Scale

- A = 89 - 100%
- B = 79 - 88.9%
- C = 69 - 78.9%
- D = 59 - 68.9%

I have determined with scientific precision that 1% of my questions are screwy and should not be counted against you (hence, the reason for the 1% shift in the grading scale). **This grade scale is fixed in stone. No curve will be applied to your final grade, nor will your final grade be re-scaled.**

All exams are multiple-choice and cover roughly equal amounts of material. The lowest score of the three regular exams will be dropped from consideration of the final grade. The final exam grade will not be dropped under any circumstances. ***The final exam is comprehensive, although it will emphasize material on which you have not already been tested (i.e., Community Ecology and Ecosystems; see below).***

Test Make-Up Policy – Test dates are decided in advance and will not be changed. Don't count on being able to take exams whenever you please. **Exams missed due to illness or other legitimate reasons will either be dropped or made up during the final exam period. If you choose to make up an exam, you must notify me ahead of time and be prepared to take it during the final examination after you have completed the final exam.**

Those students who score 90% or better on the first two exams will be given the option of not taking and thus dropping the third exam.

Schedule and Outline

Recommended Text Reading

Introduction	Chapter 1
What is Ecology?	
Ecology vs. Environmentalism	
Ecologists Use Experiments, Observations and Models to Answer Ecological Questions	
Unit 1 - Organisms and Their Environment	
The Physical Environment	Chapter 2
The Biosphere, Biomes, and Local Vegetation Patterns	Chapter 3
Vegetation Types of Mississippi	Not in Text
How Do You “Measure” the Environment?	Chapters 4,6
External, Ecological, and Selective Environments	
Phenotypic Plasticity	Chapters 4,7
Acclimation	
Dormancy and Tolerance of Extremes	Chapter 4
Homeostasis and Circadian Rhythms	
Endothermy and Ectothermy	

Exam 1 – Monday, February 10

Unit 2 - Populations	
What are Populations and Why Study Them?	Chapter 8
Population Growth and Regulation	Chapter 9
Exponential Population Growth and r	
Geometric Population Growth and λ	
Growth in Age-Structured Populations	
Density-Dependence	
Practical Application - Sustainable Yield of Fisheries	
Population Dynamics	
Demographic Stochasticity and Environmental Fluctuations	Chapter 10
Population Viability Analysis	
Metapopulations and Dispersal	
What is a Metapopulation?	
What is a Patch?	
What is the Classical Levins Metapopulation?	
What Influences Extinction and Colonization?	
The Conservation Significance of Metapopulations	
Landscape Ecology and Metapopulations	Chapter 23 P 502-514

Exam 2 – Wednesday, March 5

Unit 1 (Revisited) Evolution and Ecology	
What is Evolution?	Chapter 6
Mechanisms of Evolution	
Adaptation	
Parallelism and Convergent Evolution	
Speciation	
Sex and Breeding	Chapter 7
What Good are Males?	

Sex and Reduced Competition among Siblings	
Sex and Superfit Offspring	
Sex and the Red Queen Hypothesis	
Social and Altruistic Behavior in Animals	
What is Altruism or Why do Bees Die After They Sting You?	
What is Group Selection?	
What is Kin Selection?	
Life History Analyses	
Life History Trade Offs	
Why Delay Reproduction?	
Advantages of Early Reproduction	
Delaying Age at First Reproduction to Increase Reproductive Output	
Bet-Hedging: Iteroparity, Dormancy and Spreading the Risk of Reproductive Failure	
Why Die? The Evolution of Senescence	
Sexual Selection	Not in Text
Sexy Sons; Choosy Females	
Good Genes; Choosy Females	
Competitive Males	
Life-History Strategies: A Summary	Chapter 7
r-K continuum Theory	

Exam 3 – Friday, April 4

Units 3 and 4 - Interactions Among Organisms and Communities	
What is a Community?	Chapter 15
Key Properties of Communities	
What is Species Diversity?	
Types of Biological Interactions	Ch 11-14
Interspecific Competition and the Competitive Exclusion Principle	Chapter 11
Lotka-Volterra Predictions	
Limitations of the Competitive Exclusion Principle	Chapter 18
Equilibrium Hypotheses of Species Coexistence	Chapter 18
Disturbances and Diversity	Chapter 18
Succession and Alternative Stable States	Chapter 16
Biodiversity and Human Health:	
The Ecology of Disease - Can Prevention be a Cure?	Chapter 13
The Dilution Effect - A Case Study of Lyme Disease	
Unit 5 - Ecosystems	
What is an Ecosystem?	Chapter 19
Energy Flow and Food Webs	Chapter 20
Production	Chapter 19
The Global Carbon Cycle and Global Warming	
Forests as Sinks and Storage Pools	Chapter 24
Nutrient Regeneration in Terrestrial Ecosystems	Chapters 21,24
Fixation and Loss of N	
Phosphorus and soil pH	
Movement of Energy/Nutrients in Aquatic Ecosystems	
Energy/Nutrient Export from Coastal Marshes	
The Consequences of Species Diversity	Chapter 18

Final Exam (Friday, 8:00 am, May 9, 1 hour, 15 minutes) – Comprehensive, but 90% of the questions will be on material covered since exam 3. Make-up exams will be given following the final exam.

I assume that all students have read the instructions listed above and are familiar with them by January 24. All students are responsible for following the instructions and procedures of this class.

Enjoy the semester!

Steve Brewer